

## 6.0 Species Accounts: Life Histories of Special Status Species

### 6.1 Yuma myotis *Myotis yumanensis*

Listed by the USFWS as a “Federal Special Concern Species” and DFG as a “California Species of Special Concern”

The Yuma myotis is described as having short rounded ears with a pointed tragus, and lacking a keeled calcar. The body is light buff to dark brown with lighter underparts. The fur is darker at the base and dull-looking. The braincase rises sharply from the rostrum giving it a steep sloped appearance. Body measurements are: total length, 73 to 91 millimeters; foot, 9 to 11 mm (Ingles 1965); forearm, 32 to 38 mm; ears length, 11 to 14.5 mm; and greatest length of the skull, 13 to 14.2 mm.

The Yuma myotis is very similar in appearance and can be very difficult to distinguish from the little brown bat (*Myotis lucifugus*). The two species may hybridize where their ranges overlap in the mid to north western, northeastern, and eastern parts of California. The Yuma myotis usually has dull-tipped fur and a sharp slope to the forehead compared to the shiny-tipped fur and more gradually sloping forehead of the little brown bat. Some subspecies of *M.yumanensis* may have shiny fur, however. The Yuma myotis is generally larger in size than the little brown bat, but overlap does occur in measurements and slope of forehead.

The Yuma myotis occurs along the western quarter of North America, from Canada south to Mexico, and eastward to Idaho and Texas; including parts of Montana, Utah and Colorado; excluding most of Nevada and areas north eastward. The species is comprised of six subspecies with four subspecies (*M.y. saturatus*, *M.y. oxalis*, *M.y. sociabilis*, *M.y. yumanensis*) occurring in California (Hall 1981).

This bat is common in California and found throughout the state except in the Mojave and Colorado Deserts of southeastern California. It occupies a variety of habitats below 11,000 feet (3,300 meters), but is rare above 8,000 feet (2,560 meters). The Yuma myotis is found in open forests and woodlands and is almost always associated with water.

It emerges one to 2-1/2 hours after sunset to forage on a variety of flying and aquatic insects. Throughout the night this species will use night roosts located in buildings, mines, caves, or crevices. Such roosts may also be used as day, hibernation, and maternity roosts (Zeiner 1990). Elevational migrations may occur in some parts of its range to preferred hibernacula during the winter months. The Yuma myotis has been known to roost with other species such as the pallid and Mexican free-tailed bats.

Like other myotis species, the Yuma myotis breed in the fall and the females store the sperm until when ovulation and fertilization occurs. At this time, the females typically form large maternity colonies in dark, warm, and

poorly ventilated roosts such as old buildings, caves, and bridge structures. Females usually give birth to one young per year, but occasionally twins may be born. After the young are born, typically between May and July, these colonies may contain several thousand females and young.

Reasons for decline of this species include loss of habitat (including suitable roosting sites) and the use of pesticides.

## 6.2 Long-eared myotis *Myotis evotis*

Listed by the USFWS as a “Federal Special Concern Species”

The long-eared myotis can be distinguished by its large ears, extending approximately 7 millimeters beyond the muzzle when laid forward. Other characteristics include a long, pointed tragus; gradually sloping forehead; black wing membranes and ears; and light to dark brown fur. Body measurements are: total length, 75 to 97 millimeters; foot, 7 to 10 mm (Ingles 1965); ear length, 18 to 22.4 mm; forearm length, 35.5 to 41 mm; and a greatest length of skull, 15 to 16.4 mm (Hall 1981).

This myotis is distributed from British Columbia, south to Baja California and east to North Dakota, and then southward through South Dakota, Nebraska, and New Mexico; excluding the southern deserts of Arizona and California. Two subspecies exist in North America (*M.e.evotis*, *M.e.pacificus*), and both are found in California (Hall 1981).

This species can be found throughout California except in the hot Central Valley and deserts of southern and southeastern California. This bat can be found in brush, woodland and forests habitats up to 9,000 feet (2,700 meters), possibly preferring coniferous woodlands and forests (Zeiner et al. 1990).

The diet consists of many different arthropods, with a preference for beetles unlike other myotis species. It tends to feed over water, among trees and shrubs within 40 feet (12 meters) of the ground and catch its prey in flight, on the ground, or gleaning from foliage. This bat is capable of hovering, allowing it to feed on the edges of habitat or over water. Compared to other species, it tends to emerge later in the evenings to forage.

The long-eared myotis can be found using rock outcroppings, crevices, mines, caves, loose bark on trees and snags, and buildings as diurnal roosts. Night roosts can be found in caves, mines, and structures such as bridges (Brown and Pierson 1996). They typically roost as solitary individuals or small clusters. Maternity colonies may include 12 to 30 individuals. Mating likely occurs in the fall with one young born, typically, in May to June. The young are able to fly by early August. Winter habits of the long-eared myotis are not readily known, but they may make short movements to hibernating sites.

The destruction of suitable roosting sites and maternity colonies is probably the main reason for decline. Pesticide use, eradication from buildings, and destruction of foraging habitat could also play a critical role.

## 6.3 Fringed myotis *Myotis thysanodes*

Listed by the USFWS as a “Federal Special Concern Species”

The fringed myotis is characterized by light to dark brown fur, a well-developed sagittal crest, large ears that extend 3 to 5 millimeters beyond the muzzle when laid forward, and a conspicuous fringe of hair along the border of the interfemoral membrane. Body measurements are: total length, 80 to 95 millimeters; foot, 8 to 11 mm (Ingles 1965); ear, 16 to 19 mm; forearm, 39.8 to 46.0 mm; and greatest length of skull, 16.2 to 17.2 mm (Hall 1981).

The fringed myotis is distributed from British Columbia south to southern Mexico and in the United States from the west coast to southwest Montana, down through Idaho, Utah, the southwest quarter of Colorado, New Mexico, and western Texas. Three subspecies are recognized with only one, *M.t. thysanodes*, found in California (Hall 1981).

This bat is found throughout California below 9,350 feet (2,850 meters), excluding the Central Valley and southern deserts. It appears to be common locally in main habitats including pinyon-juniper, valley foothill hardwood and hardwood conifer forest from 4,000 to 7,000 feet (1,300 to 2,200 meters) (Zeiner et al. 1990). In other parts of its range, it has been documented in desert scrub and grasslands at intermediate elevations (Davis and Schmidley [1947] 1994).

The diet consists of a variety of insects, primarily beetles. Prey may be captured on the ground or gleaned from the foliage. This bat is also capable of hovering and forages in open areas around streams, lakes, and ponds. Activity begins soon after sunset with peaks usually one to two hours and sometimes four to five hours afterward. This species is fairly tolerant of cold, but hibernation may occur from October to March. Short migratory movements to hibernating sites may occur.

The fringed myotis may roost in caves, buildings, and crevices with adults and subadults forming segregated groups. Breeding occurs in the fall, and the female stores the sperm through the winter months until ovulation. Fertilization and implantation occur in the spring. Large maternity colonies of up to 200 individuals form from late April to September. During this time a single young is born from May to July, typically in late June after a 50-to-60-day gestation period. Young are capable of flight at 16 to 17 days but remain dependent upon their mothers who will continue to nurse them through August.

This bat is easily disturbed at roost sites, which may be a cause of decline in the species. The destruction of suitable roosting sites, pesticide use, eradication from buildings, and destruction of foraging habitat could also be critical factors.

#### **6.4 Long-legged myotis *Myotis volans***

Listed by the USFWS as a “Federal Special Concern Species”

The long-legged myotis is described as having cinnamon red to dark brown fur above and lighter brown to buff fur below. Hair extends from the body outward to the elbow on the wing membrane and down to the knee on the interfemoral membrane. The forehead is abruptly sloped with a low sagittal crest; the ears are rounded and small, not reaching the muzzle. The bat also has small feet and a keeled calcar. Body measurements are: total length, 87 to 103

millimeters; tail, 37 to 49 mm; tibia, 16.5 to 19 mm (Ingles 1965); ear, 11 to 14 mm; forearm, 35.2 to 41.2 mm; and a greatest length of skull, 12.2 to 15 mm (Hall 1981).

Distribution of this species is from North Dakota, south through Texas, and west to the Pacific Coast of the United States, central Mexico, Baja California, and central to north western Canada. There are four subspecies described by Hall (1981), with two (*M.v. interior* and *M.v. longicrus*) occurring in California.

This is a common bat found in all the mountain ranges above 4,000 feet (1,200 meters) and is excluded only from California's Central Valley, the Colorado and Mojave Deserts, and eastern Lassen and Modoc Counties. The long-legged bat can be found in woodland, forest, chaparral, shrub and coastal scrub habitats and is uncommon in arid grassland and desert habitats.

Feeding typically occurs during the first three to four hours after sunset when they forage near trees and cliffs, over water, and in wooded openings, 10 to 15 feet (3 to 5 meters) above the ground. The diet consists primarily of moths and other flying insects. Emergence for the evening forage is typically later than other myotis species but still occurs near dusk. Information on winter habits is lacking, but they probably make short migrations to hibernating sites.

Suitable day roosts include tree hollows and cavities and under loose bark on large snags and trees. Suitable evening roosts and hibernacula include caves and mines. Nursery colonies may consist of several hundreds of bats under the bark of trees or in hollow cavities and occasionally in crevices of rocks or buildings.

Breeding occurs in the fall, but the sperm is stored in the reproductive tract of the females until ovulation occurs in March and May and then fertilization occurs. Females give birth to young from late June to July (Siders 1996). Lactating females can be found from July to August, and young may reach flight capabilities in July.

This bat is easily disturbed at roost sites, which may be a cause of decline in the species. The destruction of suitable roosting sites, pesticide use, eradication and exclusion from buildings, and destruction of foraging habitat could also play a critical role.

## **6.5 Small-footed myotis *Myotis ciliolabrum***

Listed by the USFWS as a "Federal Special Concern Species"

The small-footed myotis is described as having buff to golden brown fur above, usually with glossy tips and buff to white below. The face and ears are black giving the appearance of a mask. When the ear is laid forward it barely extends beyond the muzzle. The calcar is long and keeled and the forehead is gradually sloped between the rostrum and braincase. The small-footed myotis closely resembles the California myotis which has a steep slope to the forehead, and the ears extend beyond the muzzle when laid forward (Hall 1981). In addition, the tail of the small-footed myotis extends approximately 4 mm beyond the edge of the uropatagium, where as the California myotis tail does not

(Constantine 1998). Body measurements are: total length, 75 to 88 millimeters; foot, 7 to 9 mm (Ingles 1965); ear, 12.2 to 15 mm; forearm, 29.6 to 36 mm; and greatest length of skull, 13.1 to 14.7 mm (Hall 1981).

The small-footed myotis is found from southwestern Canada, south to Mexico and distributed all over the United States except along the north Pacific Coast, the south eastern states, and the center portion of the United States. Four subspecies of *M. ciliolabrum* occur in the United States; only one species, *M. ciliolabrum melanorhinus*, occurs in California (Hall 1981).

This species is a common bat of arid uplands in the Upper Sonoran and Transition life zones of California. It occurs along the southern half of the California coast and the west and east slopes of the Sierra Nevada below 8,900 feet (2,700 meters). They seem to prefer open stands in forests, woodlands, and brushy habitats.

The small-footed myotis feeds on a variety of small flying insects including moths, flies, and beetles, while flying over water and among trees. It requires more water than most other bats and can be found drinking shortly after emergence from the roost.

The small-footed bat can be found roosting in caves, buildings, crevices and sometimes under bark and bridges, preferring more humid areas. It emerges shortly after sunset with activity peaks approximately 30 minutes and two to three hours after sunset. This bat may make small movements to hibernacula to hibernate from November to March but has a very high tolerance of cold temperatures (Cockrum and Cross 1964, Jones 1965).

Like other myotis species, these bats mate in the fall and the female stores the sperm until spring when she ovulates (Siders 1996). In the spring, females may form small maternity colonies with up to 20 individuals and bear either a single young or twins from May through June. Young are usually able to fly by mid-August (Tuttle and Heaney 1974).

Reasons for decline of this species include loss of habitat, suitable roosting sites (including destruction and disturbance), and pesticide use.

## 6.6 Western red bat *Lasiurus blossevillii*

Listed by the USFS as a “Sensitive Species”

The western red bat is a medium-sized bat with short, rounded ears, and a densely furred body. The western red bat's coloration ranges from bright orange to yellow-brown fur and black wing membranes. Unlike the eastern red bat (*L. borealis*), the western red bat does not have white tips on its dorsal fur (Davis and Schmidley [1947] 1994). The western red bat is slightly smaller than the eastern red bat with a forearm length of 35-45 mm. Both the western and eastern red bats have a densely furred posterior uropatagium while the anterior side of the membrane is only sparsely furred.

The western red bat can be found throughout lower elevations in western Canada, the western United States, western Mexico, and in Central America (Best et al 1999). In California, the western red bat can be found in lower elevations with the exception of desert regions. Although the western red bat

migrates, in California it travels only short distances making it a year-round resident.

As the western red bat roosts in trees, it can mostly be found in wooded and riparian areas. These wooded areas can be made up of almost any type of California lowland forest or woodland, including orchards, up to low elevation coniferous forests in the Sierra Nevada. Foraging habitat of the western red bat includes grasslands, shrub lands, open wooded areas, agricultural lands, and even street lamps usually within about 920 meters of their roost (Snow). While foraging, red bats target moths, crickets, beetles, and cicadas, although size appears to be the most discriminating factor in prey selection. Most foraging occurs high over the tree canopy one to two hours after sunset.

The red bat roosts primarily trees and sometimes in shrubs 0.6 to 13 meters above ground. These types of vegetation provide not only cover but also camouflage. Snow writes of an account where a red bat looked so much like a dead leaf that a person actually picked the bat off a peach tree. Trees are used for summer roosts and hibernacula. Red bats have also been documented hibernating in duff.

Mating occurs from August to October. Like other bat species, the sperm is stored until early spring when ovulation and fertilization occur. After fertilization the gestation period is approximately 65 days after which the female red bat gives birth to one to five young. Usually a female will give birth to only two or three young. The young begin to fly at 4 to 6 weeks and nurse until 3 to 6 weeks (Zeiner 1990). The red bat does not form maternal colonies but instead will form family groups made up of a female and her offspring.

The western red bat is rare throughout the state. The most common cause of the species' rarity is conversion of riparian roosting communities into agricultural fields. Other causes of decline include agricultural spraying, fire, and predation. Predators of the red bat include owls, hawks, opossums, cats, and jays.

## **6.7 Spotted bat *Euderma maculatum***

Listed by the USFWS as a "Federal Special Concern Species" and DFG as a "California Species of Special Concern"

The spotted bat is described as having extremely large ears, a dark body, and three white patches, or spots, (one on the rump and one on each shoulder) on its back. The abdominal hairs are black with white ends. A bare patch of skin is found on its throat. The ears and wing and tail membranes are pinkish red. The total length of the spotted bat is 107 to 115 millimeters, the ear measures 37 to 47 mm, and the length of the forearm is approximately 48 to 51 mm (Hall 1981). This species has the largest ears of all North American bat species.

The spotted bat is considered to be one of North America's rarest mammals (Zeiner et al. 1990). It has been recorded from British Columbia to Mexico in the western United States. In California traditionally it was thought to be found primarily in the southeastern Sierra foothills, mountains, and desert regions, with only occasional occurrences outside this range. Recent studies over the past 10

years have documented significant occurrences of this species well outside of its historical range. These range expansions have documented the distribution of this species to include Ventura, Riverside, Mariposa, Kern, San Bernardino, San Diego, Fresno, Inyo, Shasta, Tehama, Tuolumne, Mono, and Tulare Counties (Pierson and Rainey 1998a). This bat may also be a yearlong resident with recorded occurrences in Mecca, Red Rock Canyon; Yosemite Valley, California; and Reno, Nevada (Hall 1981).

Horizontal rock crevices provide the optimal roost sites (Watkins 1977) although they may occasionally use caves and buildings as well. Spotted bats may migrate from high elevations to lowlands in fall. In many accounts, sightings are associated in or around water. This finding has led some to believe that the spotted bat may inhabit riparian areas (Siders 1996).

This bat is a late flier compared to most other bats and is not frequently caught until after midnight (Watkins 1977). The spotted bat flies 15 to 45 feet (4.5 to 14 meters) above the ground in large elliptical paths [600 to 900 feet (183 to 274 meters) long] while foraging (Wai-Ping and Fenton 1989). It feeds primarily on moths, although there is some evidence that beetles are also part of their diet. Spotted bats have been observed to land on the ground and capture food items (Watkins 1977).

The spotted bat is apparently a solitary animal. It mates in the fall, with a single young born before mid-June; lactating females have been found from June to August.

Because of the rare nature of this animal and minimal information about its range, it has been included as a potentially occurring species. Factors for its decline are unknown.

## **6.8 Pale big-eared bat *Corynorhinus townsendii pallescens***

Listed by the USFWS as a “Federal Special Concern Species,” DFG as a “California Species of Special Concern”, and USFS as a “Sensitive Species”

Like other big-eared bats, the pale big-eared bat can be identified by its very large, forward-facing ears, pointed tragus, horseshoe shaped nose, and the lack of a keel on its calcar. The pale big-eared bat has a brown to cinnamon back with the hair bases being light cinnamon to brown. The belly fur hair bases are fawn to brown with tips that are light pinkish cinnamon to pinkish buff. Immature individuals tend to have a grayish tinge to their coats.

*C. t. pallescens* is the palest and most yellow of the *C. townsendii* subspecies (Handley 1959).

In Northern California and the extreme portions of the Northwest, the pale big-eared bat shows a much darker phenotype than in other areas which makes it virtually indistinguishable from the Townsend's western big-eared bat (*C. t. townsendii*) in this part of its range (Handley 1959). In other areas where the two subspecies ranges overlap, they can be distinguished by the color of their fur. There have been attempts to distinguish these two subspecies genetically, but efforts have been unsuccessful (Pierson and Rainey 1998b).

The size of the pale big-eared bat varies by region and sex. Based upon data collected central and northern Arizona, general measurement ranges are as follows. Females: total length, 93-105 millimeters; hindfoot, 9-11 mm; forearm, 40.9-43.8 mm; and wing spread, 302-310 mm. Males: total length, 95-101 millimeters; hindfoot, 9-11 mm; forearm, 43.5-44.6 mm; and wing spread, 305-311 mm.

The pale big-eared bats occur over the majority of the western half of the United States except along the Pacific Coast north of the Channel Islands. In California, it has been documented from Siskiyou to San Diego Counties in the Sonoran Transition Zone below 9,600 feet (Handley 1959). The habitats most closely associated with this species include coastal forests, oak woodland, low elevation forests of the Sierra Nevada, and semi-arid scrubland of the eastern Sierra foothills and desert areas.

Roosting sites are restricted to caves and cave-like structures such as tunnels, mines, and bridges. This species is perhaps the most characteristic of bats to dwell in caves and abandoned mine tunnels (Barbour and Davis 1969) and shows a high site fidelity if left undisturbed. From October to April, they typically hibernate, roosting singly or in small clusters in their cool roosts. In California, nursery colonies can be found in mines and sometimes in the attics of buildings from May to June. The males are solitary in the spring at which time the females form maternity colonies, sometimes consisting of several hundred individuals. Females return to their natal groups every spring. This species does not migrate but may make short elevational movements.

This bat is thought to be a moth specialist, foraging by gleaning insects from shrubs and trees while feeding along habitat edges. Peak activity occurs in the late evening.

Breeding occurs from October to February (some prior to hibernation) with the female giving birth from May to June after a gestation period of 56-to-100 days. One young is born per year and can fly by 3 weeks of age. The young are weaned at 6 weeks of age.

In the past 40 to 60 years there have been significant declines in the number of maternity colonies, roosts, average colony size, and the total number of big-eared bats (Pierson and Rainey 1998b). Reasons for decline include loss of suitable roosting habitat, which includes destruction and disturbance, and to some degree, pesticides. They are extremely sensitive to disturbance at roosting sites, and all known nursery colonies in California's limestone caves have been abandoned. Few maternity colonies have been found in buildings.

## **6.9 Townsend's western big-eared bat *Corynorhinus townsendii townsendii***

Listed by the USFWS as a "Federal Special Concern Species," DFG as a "California Species of Special Concern," and USFS as a "Sensitive Species."

Like other big-eared bats, the Townsend's has large, forward facing ears measuring 30 to 36 millimeters in length that are joined across the forehead. The tragus is pointed, and no keel is present on the calcar. Body measurements



vary by sex but are as follows. Females: total length, 100 to 112 millimeters; hindfoot, 11 to 12 mm; and forearm length, 43.3 to 44.7 mm. Males: total length, 96 to 103 millimeters; hindfoot, 10 to 11 mm; and forearm length, 41.2 to 42.5 mm. There are two glandular lumps between the nose and eyes. The adults' fur coloring ranges from dark to medium-light brown with the darkest individuals having very little variation between the bases and the tips of the hairs and light individuals having considerable variation between the bases and tips of the hairs (Handley 1959).

This subspecies has the shortest wingspan and darkest fur of the *C. townsendii* spp. When compared to *C.t. pallescens*, the townsendii subspecies is darker, slightly larger, has a heavier rostrum, and has a more robust skull (Handley 1959).

Their range and distribution covers the coastal regions from southwestern Canada along the Pacific Coast to Santa Barbara County in California. The inland boundary appears to be the eastern edges of the coast range. They are rarely captured in mist nets making it difficult to assess their exact distribution (Barbour and Davis 1969).

Suitable roosting sites are restricted to caves and cave-like structures such as tunnels, mines, and bridges. This species is perhaps the most characteristic of bats that dwell in caves and abandoned mine tunnels (Barbour and Davis 1969).

In California, nursery colonies can be found in mines and sometimes in the attics of buildings. Hibernation occurs from October to April when they may be solitary or in small clusters in their cool roosts. This species shows a high site fidelity if left undisturbed. The males are solitary during spring when the females form maternity colonies that may consist of several hundred individuals. Females return to their natal group every spring. This species does not migrate, but does make shorter movements.

This bat is thought to be a moth specialist, foraging by gleaning insects from shrubs and trees while feeding along habitat edges. Peak activity occurs in the late evening.

Breeding occurs from October to February (some prior to hibernation). Young are born from May to June after a gestation period of 56-to-100 days. One young is born per year and can fly by 3 weeks of age. Young are typically weaned at 6 weeks of age.

In the last 40 to 60 years there have been dramatic declines in the number of maternity colonies, number of roosts, average colony size, and total number of *C. townsendii* spp. (Pierson and Rainey 1998b). Reasons for decline of this species include loss of suitable roosting habitat, which includes destruction and disturbance, and to some degree, pesticides. They are extremely sensitive to disturbance at roosting sites, and all known nursery colonies in California's limestone caves have been abandoned. Few maternity colonies have been found in buildings.

## 6.10 Pallid bat *Antrozous pallidus*

Listed by the DFG as a "California Species of Special Concern" and USFS

as a “Sensitive Species”

Pallid bats are large bats with big ears that are not joined together on their head. They also have large eyes and broad wings. The fur on their dorsum is creamy to light brown at the base with brown or gray tips while the ventral fur is pale creamy to white. The wing membranes are tan (USGS 1998). The pallid bat has a pig-like muzzle and wart-like bumps on its face. The measurement ranges are: total length, 114 to 135 millimeters (Ingles 1965); ear length, 23 to 27 mm; and forearm length, 48 to 60.2 mm (Hall 1981). The tragus is long and lanceolate, longer than one half of the length of the pinna. The females are generally heavier than the males.

Pallid bats occur throughout California, except in the high Sierra Nevada, from Shasta to Kern Counties and the extreme northwest of the state from Del Norte and western Siskiyou Counties (Hall 1981). These bats inhabit a variety of habitats, including grasslands, shrublands, woodlands, and forests from sea level up through mixed coniferous forests below 8,000 feet. They are common in grasslands and desert regions in the southwestern United States and most abundant in the Sonoran life zones. They tend to be less abundant in evergreen and mixed forests than in vegetation assemblages characteristic of lower elevations (Hermanson and O’Shea 1983). In California pallid bats are associated with oak woodlands at lower elevations (BioSystems 1994) and may roost in a variety of places including tree cavities, rock crevices, and structures.

The diet of the pallid bat consists of a variety of insects, with a preference for Jerusalem crickets, moths, froghoppers, leafhoppers, June beetles, and grasshoppers (Davis and Schmidley [1947] 1994). Pallid bats have also been known to feed on arachnids such as spiders and scorpions. While foraging over open ground for these insects, they generally fly slowly and close to the ground (0.5 to 2.5 meters). While most of their prey are captured by gleaning, it is not uncommon for them to land on the ground to capture prey items such as the Jerusalem cricket. Unlike that of other bat species, very few of the pallid bat’s prey are actually taken in the air. In desert regions it has been found that the pallid bat tends to feed on insects visiting cacti and agave flowers. In the process of feeding on these insects, the bat acts as a pollinator for these plant species. There is no evidence that the pallid bat feeds on the nectar of the flowers (Herrera et al. 1993).

The pallid bat is a social animal, sharing roosts with 20-160 individuals. Pallid bats have been known to share roosts with other bat species such as the Mexican free-tailed bat (*Tadarida brasiliensis*) and many *Myotis* species. The same types of roosts can be used as day and night roosts. Pallid bat estimated travel from day to night roosts is 1.86 miles (3 kilometers). They may make longer movements to hibernacula and for post-breeding dispersal. Pallid bats prefer roosts where they can be out of sight and wedged into small, tight crevices. Such sites include rock crevices, bridges, caves, mines, and hollow trees. The pallid bats use these roosts in tight-spaces sites to thermoregulate, especially during cooler weather. However, during warmer weather periods, they will roost in open areas such as the sides of rafters and open barns. Barns seem to be a preferred roost site because there the bats can choose from many micro-habitats.

Breeding occurs from October to February. The female stores the sperm until early spring when delayed fertilization. The gestation period is 53 to 71 days for one to four embryos. Young number from one to three, but typically twins are born from May to June. The young open their eyes at 8 to 10 days and are capable of flight at 6 weeks (Davis and Schmidley [1947] 1994). There is evidence, however, that young may continue to nurse even after 6 weeks. The females will breed in their first autumn while the males not until their second year.

Pallid bats are extremely sensitive to roost disturbance. Disturbance and the loss of roosting habitat are the leading causes of decline of the pallid bat. Natural predators include owls and snakes.

### **6.11 Greater western mastiff bat *Eumops perotis californicus***

Listed by the USFWS as a “Federal Special Concern Species” and DFG as a “California Species of Special Concern”

The greater western mastiff bat is the largest bat species in North America and belongs to the Molossid family of free-tailed bats. Two of its distinguishing characteristics are long, narrow wings and large, rounded ears that are joined at the mid-line across the forehead and project forward, extending beyond the nose.

As with all free-tailed bats, the tail extends well beyond the uropatagium, or interfemoral membrane. The measurements are: total length, from 157 to 184 millimeters (Ingles 1965); and forearm, 73 to 80 mm (Hall 1981). The color of the body fur and membranes are dark to brownish gray but may be slightly paler on the venter.

This species is uncommon but inhabits arid and semiarid lowlands in the lower Sonora life zone of California, generally below 4,000 feet. The distribution is not completely known, and new sightings in Northern California are expanding its previously recorded range. Currently in California, the greater western mastiff bat ranges from San Francisco across to the Sierra Nevada and south, encompassing the southern half of the state (Hall 1981).

The mastiff bat is apparently a permanent resident throughout its range in the United States (Barbour and Davis 1969). They primarily roost in crevices in vertical cliffs, usually granite or consolidated sandstone, and in broken terrain with exposed rock faces. They may also be found occasionally in high buildings, trees, and tunnels. Roost sites may change from season to season. Because of its large size, this bat needs vertical faces to drop from in order to take flight. This species has been documented to share roost sites with other species such as the big brown bat (*Eptesicus fuscus*), pallid bat (*Antrozous pallidus*), and the Mexican free-tailed bat (*Tadarida brasiliensis*).

The mastiff bat is a swift flier with very poor maneuverability. They are active year round, limited only when temperatures drop below 41 degrees Fahrenheit (5 degrees Celsius). Night roosts are uncommon for this species because of its ability to fly for long periods of time, up to six or seven hours a night and distances of 15 miles (24 kilometers) while foraging at higher

elevations. Their preferred diet consists of moths but includes crickets and grasshoppers (Davis and Schmidley [1947] 1994).

The greater western mastiff bat mates in the months surrounding the early spring. After a gestation period of 80-to-90 days, one young is born between April and September. The birth of twins has been documented, but is uncommon (Davis and Schmidley [1947] 1994). The young are born between April and September. Males and females can be found roosting together throughout the parturition period (Zeiner et al. 1990).

The reasons for the observed decline of this species are not well known, but include the destruction of roost sites in canyons from dam development. Other factors probably include urbanization and human disturbance.

## **6.12 San Joaquin pocket mouse *Perognathus inornatus inornatus***

Listed by the USFWS as a “Federal Special Concern Species”

The San Joaquin pocket mouse is a small buff-orange mouse with a sprinkling of darker guard hairs on its back. It does not contain any spiny hairs as do some of the other species of pocket mice. There is an indistinct lateral line on the sides that separates the lighter belly hairs from the darker, dorsal hairs. The ears are relatively short and may contain a patch of lighter hair at their base. The hind foot has hair on the sole. The tail is relatively long, covered with hair, uniform in color, and has a tuft of hair on the last 3-to-6 millimeters that may extend beyond the tip. External, fur-lined cheek pouches are used to store grass and forb seeds, which are carried back to or near their dens for eating.

The historical range was widespread throughout the Central and Salinas Valleys of California. The dry, open grassland or scrub areas with fine textured soils between 1,100 and 2,000 feet characterize the best habitat types.

The foraging habits of the pocket mouse tend to occur above ground within the cover of a shrub. They do not travel very far to forage and generally stay out of relatively open areas. They may occur on shrubby ridge tops and hillsides (Hawbecker 1951) but more characteristically inhabit sandy areas with grasses and forbs (Grinnell 1933). During extreme hot or cold weather, these nocturnal animals may become torpid or inactive (Zeiner 1990).

The diet of the pocket mouse consists of seeds of grasses, forbs, and shrubs such as *Atriplex*, which is the main preferred food source. Soft-bodied insects such as cutworms and grasshoppers are also eaten but not stored in their external cheek pouches. The pocket mouse lives in arid habitats so all water needs are metabolized through seed digestion.

Breeding season is from March to July, and the females have at least two litters of four to six young per litter. It is believed that young will remain in the birthing den until mature; however, the length of time to maturity is uncertain.

Predators include badgers, owls, weasels, skunks, foxes, and feral cats. Loss of native grasslands is the major cause of decline for this species.

### 6.13 Ringtail *Bassariscus astutus*

Listed by the DFG as a “Fully Protected Species”

The ringtail is a slender procyonid with a tail that is often as long as the body. Body length ranges between 12 and 16 inches and the tail length ranges between 12 and 17 inches. The general color is tan with black-tipped guard hairs dorsally, and yellowish white below (Kaufmann 1982). The tail is white with seven or eight black bands and a black tip. The ringtail is not much larger than a gray squirrel and weighs about 2 to 2-1/2 pounds. The raccoon is distinguished from the ringtail by its shorter tail, black mask, and larger size. A track of the ringtail will show five toes but not the semi-retractable claws. The hind feet are unique in that they can rotate 180 degrees when climbing down a tree enabling it to hold itself on the side of a tree while it is pointed toward the ground.

These nocturnal animals are primarily carnivorous, feeding primarily on rodents and rabbits but will also take substantial amounts of birds and eggs, reptiles, invertebrates, fruits, nuts, and some carrion (Taylor 1954; Trapp 1978). Food items may be obtained on the ground, among rocks, or in trees, but never far from water.

The range of the ringtail is north into southwest Oregon, throughout California except the agricultural portion of the Central Valley, east to Colorado, and south into Central America. They are found in dense riparian growth, montane evergreen forests, oak woodlands, pinyon juniper, chaparral, and deserts (Kaufmann 1982). Their territory is usually no farther than a half mile from a permanent water source. Cover for reproduction and resting includes in tree hollows, logs, snags, rocks, and abandoned burrows. Densities have been reported to be one individual per 0.3 to 7.9 square miles (Zeiner et al. 1990).

Ringtails mate in March and April and have a gestation of 40 to 50 days. One to five young (with an average of three) are born from May to June. The young weigh one ounce, have closed eyes, and are covered with white fuzzy hair. The adult female keeps the male away from the young for about 3 to 4 weeks, until the eyes open. The young are weaned at 3 to 5 months at which time they learn to hunt by watching the adults. Juveniles disperse in late fall and early winter.

Predators to the ringtail include bobcats, raccoons, foxes, and especially large owls, all of which are potential competitors for food. Other competitors include coyotes, rattlesnakes, and gopher snakes.

### 6.14 Pine marten *Martes americana*

Listed by the USFS as a “Sensitive Species”

The marten is a small mustelid weighing between 470 to 1,300 grams. Martens have long, slender bodies measuring 360 to 450 millimeters with a tail measuring 150 to 230 mm. This mustelid has sharp, curved claws, large eyes, and cat-like ears for nocturnal hunting. The marten also has a gray head with dark brown to black legs and tail. The fur is long and glossy with dorsal hairs that tend to be light brown and the chest contains a cream-colored patch.

The American marten can be found from Alaska east to Newfoundland and Nova Scotia. Southward, this animal can be found through sections of the Rocky Mountains and the Sierra Nevada range of California. The marten can also be found in some sections of Maine, Michigan, Minnesota, New York, and Wisconsin.

In California, the marten is a permanent resident of the Southern Cascade range, Sierra Nevada range, and the Klamath Mountains. In these areas martens inhabit dense, old growth coniferous forests. This animal prefers areas with a thick understory, large trees, and many large snags. All of these habitat features provide suitable den sites and adequate prey populations.

Martens are mostly carnivorous, feeding mainly on mice and voles. Martens have also been known to eat tree squirrels, chipmunks, shrews, rabbits, pikas, fish, birds, nuts, and fruit. Martens forage in many areas including on the ground, in trees, snags, around logs, and rocky areas. Martens have also been sighted foraging along the edges of water bodies. Martens can usually be found foraging at dusk and during the night, as they are nocturnal animals, but are also known to be active during the day when prey are abundant.

Martens are mostly solitary animals living a partially arboreal life. Home ranges are marked in the trees as well as on the ground. Home ranges are variable with males occupying larger areas than the females. Males and females, as well as adults and juveniles, are tolerant of one another inside their home ranges.

Breeding occurs from late July to August. After breeding, the embryos do not begin active gestation until 27 days before they are born in April. A female marten gives birth to one to five kits per year in a maternal den. Maternal dens are lined with dried plant material and normally found in squirrel middens and “cone caches,” large snags, rocks, and large logs (Ruggiero et al. 1998). The kits are weaned at approximately 42 days and reach full size at 3-1/2 months of age. Kits leave their mother and become solitary in the fall. Males will reach sexual maturity at one year and the females at 2 years of age.

Martens are becoming increasingly rare due to loss of habitat to the timber industry. Martens require old-growth forests for habitat. Road access to past lumber sites also creates a problem in that they allow human access to marten ranges. Road closures are essential in maintaining the marten’s required geographical isolation. Another reason for this species’ decline in the past was hunting for pelts. Hunting marten has since been banned in California, but left the species severely depleted. In addition to human impacts, martens are prey to a variety of species. These animals include bear, mountain lion, lynx, bobcat, coyote, gray wolf, eagles, great-horned owl, and fishers.

### **6.15 Pacific fisher *Martes pennanti pacifica***

Listed by the USFWS as a “Federal Special Concern Species,” DFG as a “California Species of Special Concern,” and USFS as a “Sensitive Species”

The Pacific fisher is a small, nocturnal carnivore measuring up to 25 inches long and weighing from 2 to 5 kilograms. Males are approximately twice the size

of females. The Pacific fisher is medium to dark brown in color with a gold sheen to their fur on their head and shoulders. The fisher's tail and legs are black. The color and pattern of a fisher's fur varies among individuals depending on its sex and the time of year. Fishers have five toes with retractable claws.

Fishers are found only in North America. The subspecies *M.p. pacifica* can be found from Alaska to California relatively near the Pacific Ocean. In California, the Pacific fisher can be found in the Southern Cascade range, the Sierra Nevada range, the Klamath Mountains, and some areas in the Northern Coastal range. In these areas, the fisher prefers large stands of mature trees with large snags with at least 50 percent canopy cover. Coniferous and hardwood forests usually provide these habitat requirements. Fishers also prefer forests with hollow trees, rock crevices, slash piles, and porcupine dens. These habitat features provide suitable denning sites.

The fisher is an agile hunter able to pursue prey anywhere from small ground burrows to the forest canopy. The primary prey items include snowshoe hare, mice, squirrels, mountain beavers, shrews, and birds. In addition to these species, fishers are the only known species that prey on and actively seek out, or hunt, porcupines. Fishers have been translocated to act as porcupine biological control agents in parts of the United States.

Fishers typically give birth to a litter of one to five young between February and May. Breeding occurs within several days of the birth of a litter. The embryo does not begin growth until the following winter. At that time, the gestation period begins and lasts approximately 30 days. Female fishers reach sexual maturity at one year of age and usually produce their first litter during their second year. This cycle means that female fishers spend their entire lives, after one year of age, in a state of pregnancy or lactation. During breeding, the females stay in their territories while the males cover long distances looking for females. Young leave their mother and disperse to begin a solitary life in late fall.

The main cause of decline of the Pacific fisher is loss of habitat, including old growth stands. In addition to habitat loss, the fisher still is hunted in many areas for its pelt.

## 6.16 American badger *Taxidea taxus*

Listed by the DFG as a "California Species of Special Concern"

The badger is a somewhat large mustelid that has evolved for a semi-fossorial life. It has powerful, short legs with partially webbed toes and claws measuring one to 1 and 1-1/2 inches long which aid in digging; the hind feet have shovel-like claws (Boitani and Bartoli 1982). The body is stout and flat, wider than high. Coloration of its shaggy coat is a silver gray with the head being dark with a white stripe that often extends down the back. The snout of the badger is slightly upturned, and the eyes are small with nictating membranes (Lindzey 1982), an adaptation for its fossorial lifestyle. The skin of the badger is loose, particularly across the chest, shoulder, and back. The tail is relatively short, moderately furred, and somewhat yellowish. The legs are black. The weight of adults can range from 12 to 24 pounds with the males weighing more

on the average.

The badger was once fairly widespread throughout the open grassland habitats of California. Badgers are now an uncommon permanent resident found throughout most of the state, with the exception of the northern North Coast. They are most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Badgers are generally associated with treeless regions, prairies, parklands, and cold desert areas (Lindzey 1982). Cultivated lands have been reported to provide little usable habitat for this species.

Badgers are basically solitary, nocturnal creatures, foraging at night and then remaining underground during the daylight hours. Badgers dig burrows with 8- to 12-inch elliptical, wider than tall, entrances, in friable soil types for cover. They generally have a single entrance. They frequently reuse old burrows, although some have been known to dig a new den each night, especially in summer. Soil excavated during formation of the den is piled at the entrance. Often when a den is occupied in cold weather, the tunnel is partially plugged.

The badger is a highly specialized fossorial carnivore. They feed primarily on small mammals, especially ground squirrels, pocket gophers, rats, mice, and chipmunks. Badgers capture their prey by digging out the prey's burrows. The badger captures some of its prey above ground and also forages on birds, eggs, reptiles, invertebrates, and carrion. Diet will shift seasonally and yearly depending upon prey availability, and badgers may bury surplus food.

One to four young are born in an extensive burrow system (Jameson [1921] 1988). Mating occurs in late summer or early autumn and is followed by delayed implantation. Implantation then occurs in December or January with the young born in March or April. At birth the young are furred but blind; they become independent by August.

The North American badger is somewhat tolerant of human activities. Predator control with the usage of indiscriminate trapping and poisons, along with habitat loss, have caused extensive losses. Additionally, road kill, farming operations, and indiscriminate shootings are also a cause of mortality. Being a fossorial animal, deaths caused by other factors may easily go undetected (Lindzey 1982). Larger predators such as coyotes occasionally kill badgers.



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